

IBOC = Its Better On Cassette

Vital Questions for broadcasters considering the new IBOC-DAB (In Band On Channel - Digital Audio Broadcasting) system proposed by iBiquity:

1) Will IBOC *accelerate* the loss of listenership of AM and FM broadcasters? *1

Media analyst Duncan American Radio reports that the "historically huge decrease in listenership (12% during the 1990s)" is due to "higher spot loads (ads) (maybe 20+ units an hour), more canned programming and a lack of programming innovation". NPR pointed out that in spite of the obviously huge increase in sound quality provided by FM over AM in the 1940s, there was little interest from the public in FM until after the FCC forced new content on to the FM stations by disallowing rebroadcast of AM content. Sony notes that the European DAB has experienced lackluster sales because the microscopic increase in signal to noise ratio for Eureka DAB for the same content has not proven to be of interest to consumers. Canadian investment analysts are saying that Canadian DAB is suffering lackluster interest by the public because Sirius and XM offer the same digital signal but with 100 channels of variety. Internet streaming is famous for its hideous sound quality and massive buffertimes, yet is gaining in popularity. These experiences suggest that people really want variety of programming more than an alleged increase in sound quality.

QUESTION: So if indeed what people really want is less ads *and more* variety, IBOC is proven to be an interference hazard to adjacent broadcasters,

IBOC will *reduce* the number of stations consumers can receive on the broadcast dial.

WILL this loss of variety accelerate consumer abandonment of AM and FM in favor of Internet, CD, tape, and satellite?

(See footnotes *1 [flip over] for detail)

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Federal Communications Commission
Office of the Secretary

2) The iBiquity survey actually claimed that Classical Music sounds better than the original source after being compressed by IBOC-DAB !

How can iBiquity claim IBOC sounds better with surveys of technology that is deceptive by nature, using possibly biased nonrepresentative samples that might have a financial stake in iBiquity? *2

Surveys provided to the FCC by the NAB (Appendix K) have an age and sex distribution that appears very similar to what you could expect from radio network executives. Furthermore, the NAB states that the New Orleans NAB sound quality survey of IBOC consisted of a pool of Austin Tx residents.

QUESTION: What was the profession of those survey participants, why was there only one woman and how did those Austin Tx residents end up in a New Orleans NAB conference to take that "objective" IBOC sound quality survey? Is it not true that the testing organization (NRSC) is organized by the NAB and CEA, whose membership has a large representation of iBiquity partners? Does this not suggest that the NRSC would be very challenged to be truly objective?

Furthermore, the "Perceptual Audio Coding" used by IBOC-DAB is by its nature deceptive since it depends on "Psychoacoustic noise masking" to trick our brain into thinking something sounds better. Proof of the questionable value of subjective surveys is the NRSC chart showing claims by survey listeners that Classical Music sounded better after being digitally compressed by IBOC than the original source! Also note in the chart the very slight change in alleged sound quality out of the total range of opinion possible.

Question: Doesn't the combination of the bizarre idea that "IBOCed" Classical Music sounds better than the original source ...and ...the tiny difference in the opinion scores suggest that the results fell within the margin of error of the Mean Opinion Score system used?

Would this not mean that there is in fact no proof *that* IBOC sounds better? (see footnote *2 on the back)

3) Will Your Signal and Budget Survive IBOC ? *3

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Even documents submitted to the FCC by the NAB show significant damage to the sound quality of first and second adjacent stations by the IBOC and of an adjacent station! Furthermore, the one test on record by an independent entity that did not gain financially from an iBiquity partnership (Virginia Commonwealth Public Press) showed that when the WJFK 106.7 FM station was tested on the IBOC sidebands ... the effective range of WJFK 106.7 FM was to cause their signal range to drop from 58 miles to 25 miles, thus denying millions of listeners access to a signal they would otherwise have access to. Can you survive a similar loss of range for your listeners? NPR and Kingsley Radio of Georgia Inc. have also submitted requests to clarify whether you will be paying forced royalties to iBiquity partners such as Clear Channel Communications Inc. to use the possibly required IBOC transmitters.

QUESTION: What will iBiquity suggest if you suffer a significant loss of analog receiver range from 58 miles down to 25 miles? What happens to your IBOC listener if your IBOC station is on the side of you 45 miles down the road? How does that listener's life change if your IBOC sidebands if both are stomped by the IBOC sidebands of your adjacent station in the next town on the dial? How does your IBOC listener's receiver "tune" if your analog is damaged by the IBOC sidebands as well? Will the width of the IBOC sideband be affected? (info on IBOC)

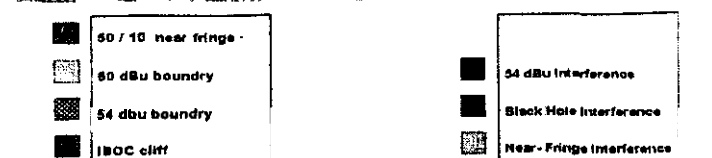
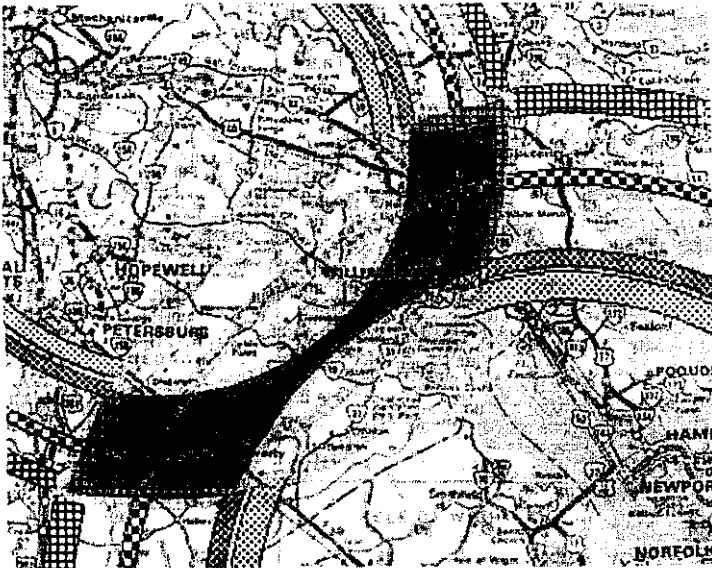
4) How will IBOC allow you to reconfigure your pure (third transition stage) IBOC signal to move the best stereo sound to the center section of the IBOC bandwidth and dynamically add two or three additional talk channels? *4 (Refer to concerned question #1 above)

NPR has stated over and over in the record on IBOC that the FCC is not allowing wireless data delivery. There is no explicit provision to allow broadcasters with a public communication mission to prioritize provision of multiple audio channels. The iBiquity talk is constantly of one audio channel and at the same time IBOC is supposed to be the most protected region of the IBOC signal not audio. The audio is to be relegated to the outer bands.

QUESTION: How will the receiver allow you to dynamically reconfigure your signal opposite the assumed commercial pattern and tell the receiver the signal pattern is reversed? Is there any way for "flash bios" that can be used to reconfigure the audio channel within the IBOC signal?

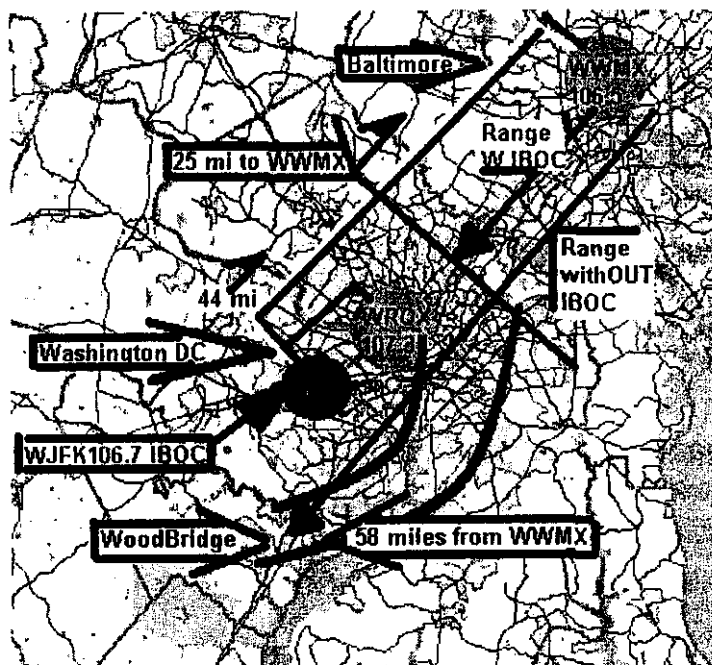
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IBOC Means lost listeners:



This map models what happens when WHRV89.5 in Norfolk and WAUQ89.7 in Charles City (just above Hopewell) both begin IBOC transmissions. In this saddle-shaped area we find we are beyond the 'IBOC cliff' for both stations. So a DAB radio would receive neither station in digital. Nor could the radio receive either station in analog because of the combined adjacent channel sideband interference which would prevent a blend to analog for either station. We refer to this area as 'The Radio Black Hole Zone'. Notice that much of that total loss of listenership is in Williamsburg, not farmland, but an entire town!

While the above is a model, our real-world study of an actual IBOC station confirmed **some** of these modeled results:



This shows you a visual of our results when we drove up I-95 and around the Washington DC Beltway during and after the test transmission. WJFK106.5 FM IBOC sidebands WWMX 103.5 from Baltimore is received after joining I-95 north of the Beltway during the IBOC test giving a 100% signal level.

WJFK106.7 IBOC sidebands WWMX 103.5 from Baltimore is received with the same car radio found reception reached to Woodbridge Va. 58 Miles away. are many of the listeners lost in that range. And even within range, your listeners experience some serious loss of sound quality:

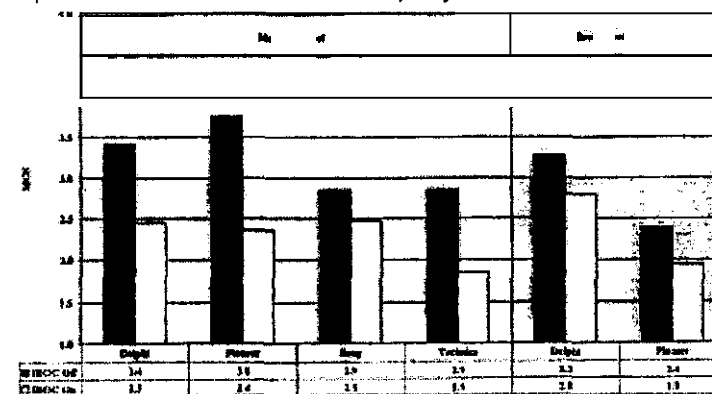


Figure 29 - Field Compatibility with 1st Adjacent Interferers At Moderate and Severe Levels - Speech

MORE INFO: <http://www.DigitalDisaster.Org>

Christopher Maxwell 804 970-2470

Yes, the National Association of Broadcasters (NAB) will say that you are not guaranteed access to your 'fringe listeners' that are listening to you as a first adjacent to another distant or weak station. But does the listener care? And if the NAB was so concerned about loss of 'fringe listeners' that the NAB alleged Low Power FM was such a threat to ... why the sudden change of heart? Are fringe listeners suddenly a worthy tradeoff whereas they were not for LPFM? Never mind the fact that LPFM would have added some variety to the radio dial to slow migration to Satellite, Internet etc.

Even Second adjacent broadcasting, which is very common for translators, is harmed by IBOC. Again this chart is taken as was the last chart from iBiquity's 12/6/01 Submission to the FCC on IBOC-DAB docket 99-325, page 44 and now page 55:

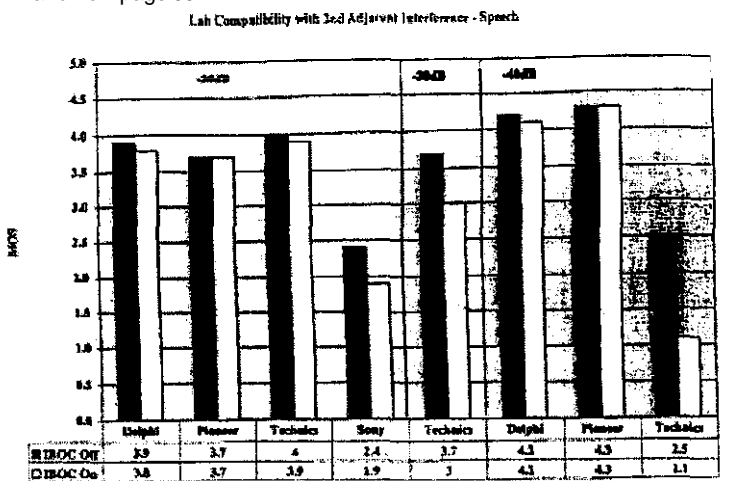


Figure 37 - Lab Compatibility with 2nd Adjacent Interference - Speech

Notice the range and variability in the Mean Opinion Scores reported for the impact of first and second IBOC sidebands on first and second adjacent analog signal quality. Anything with quiet passages is going to show off the added noise problems with IBOC-DAB on a nearby analog signal more than audio with lots of sound. Thus we can next consider an amazing claim that verges on a kind of audio equivalent of 'perpetual motion'.

Have you ever heard Classical Music sounds better compressed? Unimpaired FM Test

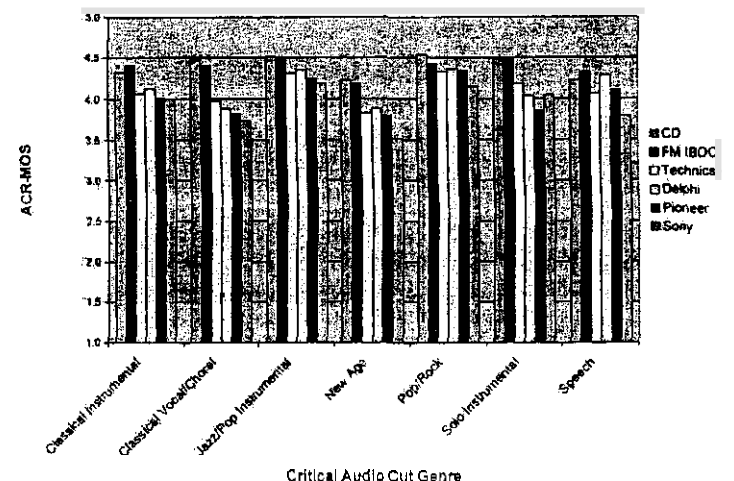


Figure 2 - Audio Quality Results by Genre

This chart is taken from iBiquity comments submitted to the FCC on 2119102 (Page 5 of Appendix B). They are displaying the Mean Opinion Score of what people think of a piece of audio sent to them straight from the CD, via FM IBOC or analog on four different receivers. It would seem that Technics does a better job than Sony as long as there is no adjacent IBOC sidebands. So which brand do you tell your listeners to get?

If you look at it, you will see that they make the amazing claim that Classical Music, Solo Instrumental and Speech all sound better after compression than from the original 'CD Quality' source. Never mind by the way that 'CD Quality' is itself still a 30 year old outdated standard for an inferior approximation of the actual sound. Notice also that if a Mean Opinion Score of 4.0 were in inches, the difference between some of those results would be on the order of a 16' of an inch!

The combination of these two items suggests that either the 'Psychoacoustic Noise Masking' of the 'Perceptual Audio Coding' is indeed good at deceiving people ... or ... that these differences are within the margin of error of the survey instrument. If this is so, then there is no objective proof that DAB does in fact sound better than analog!

iBiquity's IBOC technology IS amplitude modulated ('tones' turned on and off, just like a modem but at RF frequencies). Quite literally, IBOC will be bringing AM to the 'FM Band'.

So all the problems that are witnessed in the Medium Wave (MW) AM IBOC tests will be repeated on the Very High Frequency (VHF) 'FM Band' as well. If you look at the spacing of stations on the 'FM Band' in terms of the number of channels containing content that a typical receiver is able to receive; THEN THE FM DIAL IS EVEN MORE CONGESTED AND MORE LIKELY TO SUFFER IBOC INTERFERENCE THAN THE 'AM BAND' !!

Even iBiquity partner (and major owner of XM satellite radio) Clear Channel Communications has admitted to the FCC that IBOC sidebands may provide serious interference hazards to adjacent analog stations and have suggested a reduction in the IBOC sideband power levels! Well, considering the regularity at which FM first and second adjacents are easily received by a radio, the effects seen in AM IBOC tests will exist on the FM band as well. IBOC as an Amplitude Modulated technology will lack FMs 'capture effect' to help separate signals. AM will come to the FM band via IBOC.